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Shimizu

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(54) **ROLLER MASSAGING MECHANISM AND MASSAGING APPARATUS INCORPORATING THE SAME**

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(52) **U.S. Cl.** **601/90**; 601/93; 601/94
(58) **Field of Search** 601/22, 27, 28, 601/61, 63, 86, 87, 90–91, 93–95, 97–101, 104, 106, 80

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(74) *Attorney, Agent, or Firm*—Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

A roller massaging mechanism of a type having a pair of right and left massaging rollers mounted on an intermediate portion of a rotary shaft in a slanted fashion relative to an axis of the rotary shaft, and includes a switching member for selectively switching the position of the pair of right and left massaging rollers into one of a kneading position where the pair of massaging rollers are slanted opposite to each other and a non-kneading position where the massaging rollers are slanted parallel with each other. When the massaging rollers are caused to assume the kneading position by the switching member, a kneading massage operation is performed, while when the massaging rollers are caused to assume the non-kneading position, a massage operation other than the kneading massage operation such as a finger pressure-like massage or a tapping massage is performed

14 Claims, 15 Drawing Sheets

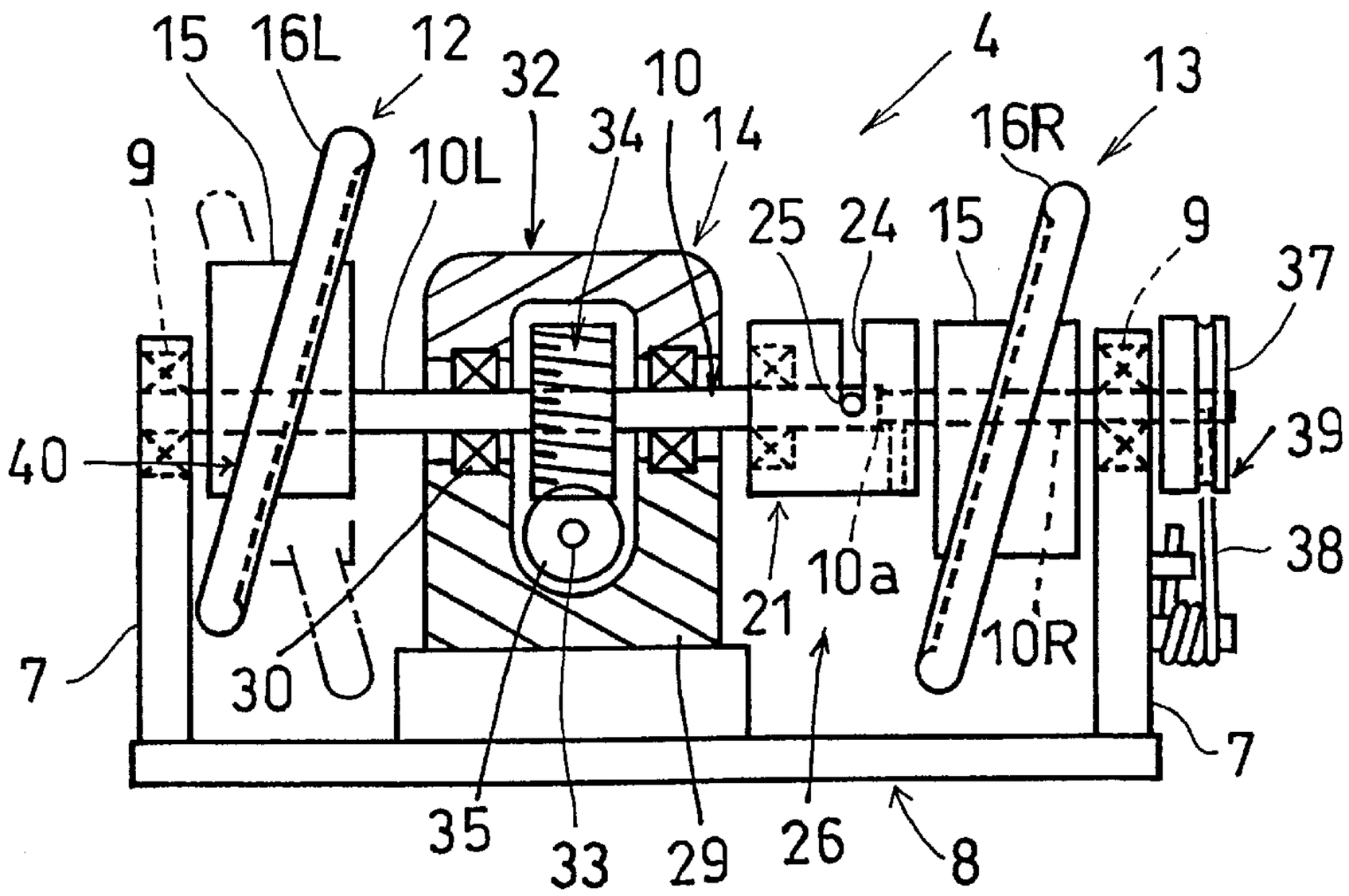
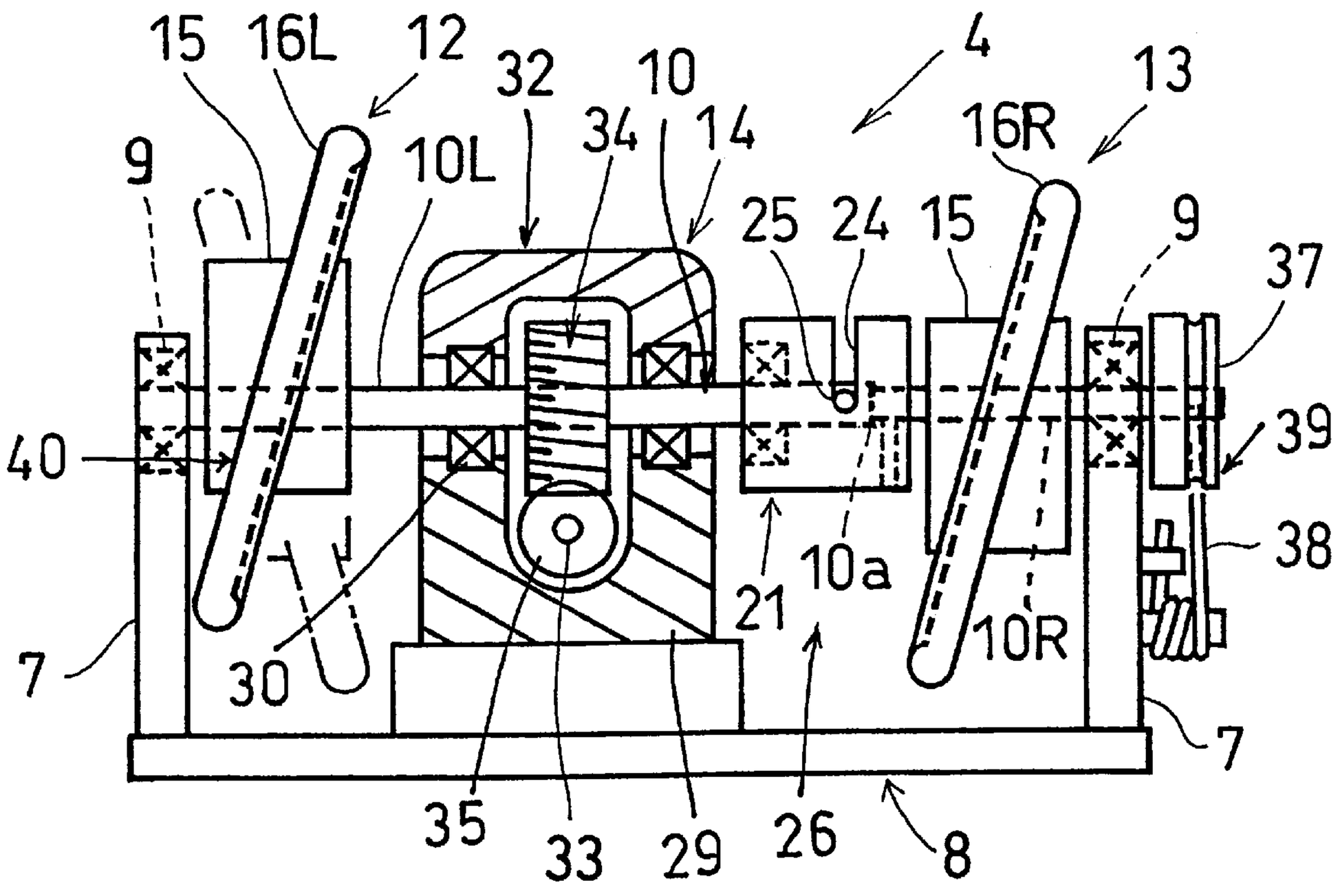


FIG. 1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16L
12
32
10
4
13
9
10L
34
14
16R
25
24
15
9
37
40
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38
21
10a
10R
7
30
7
35
33
29
26
8

FIG. 2

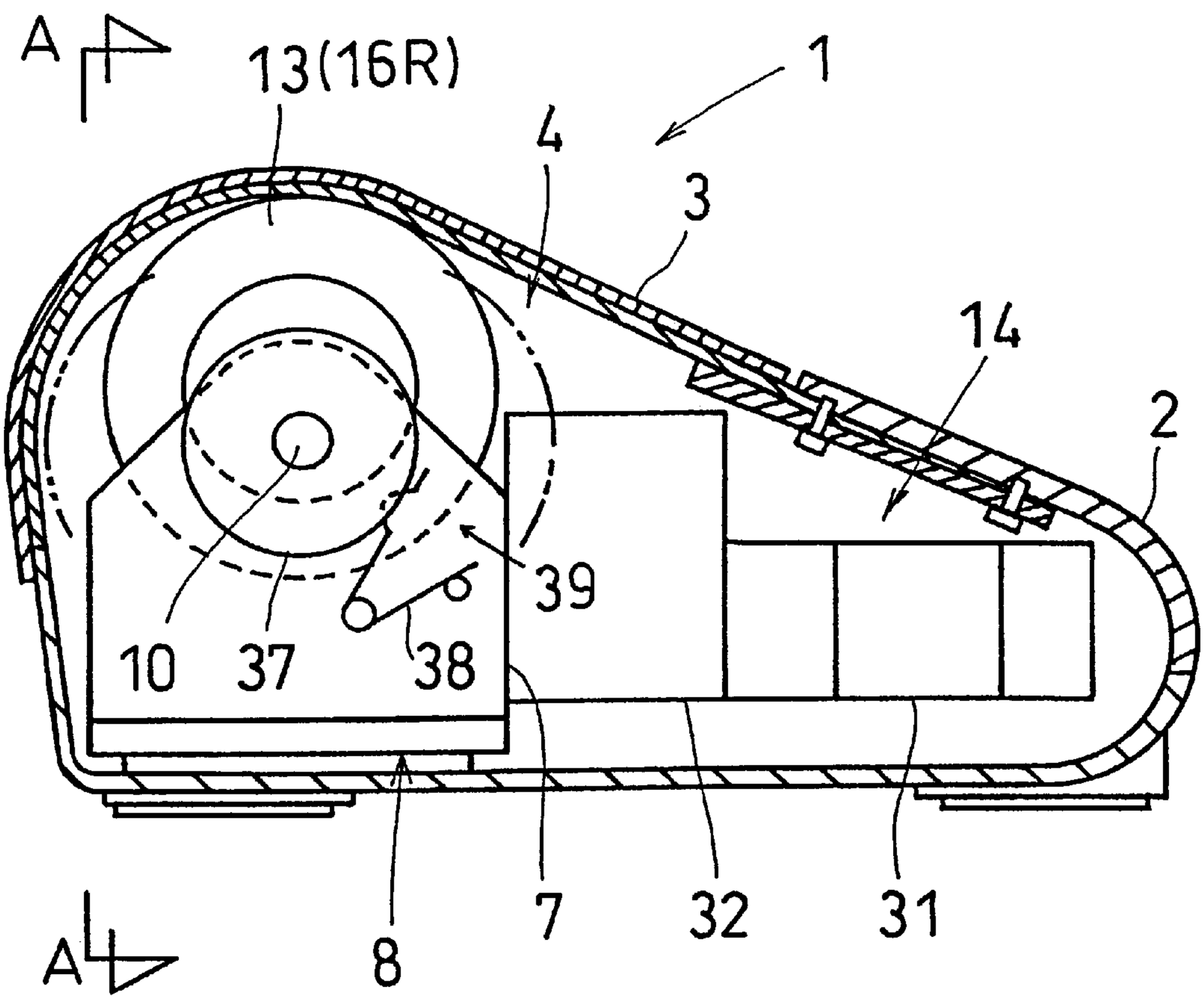
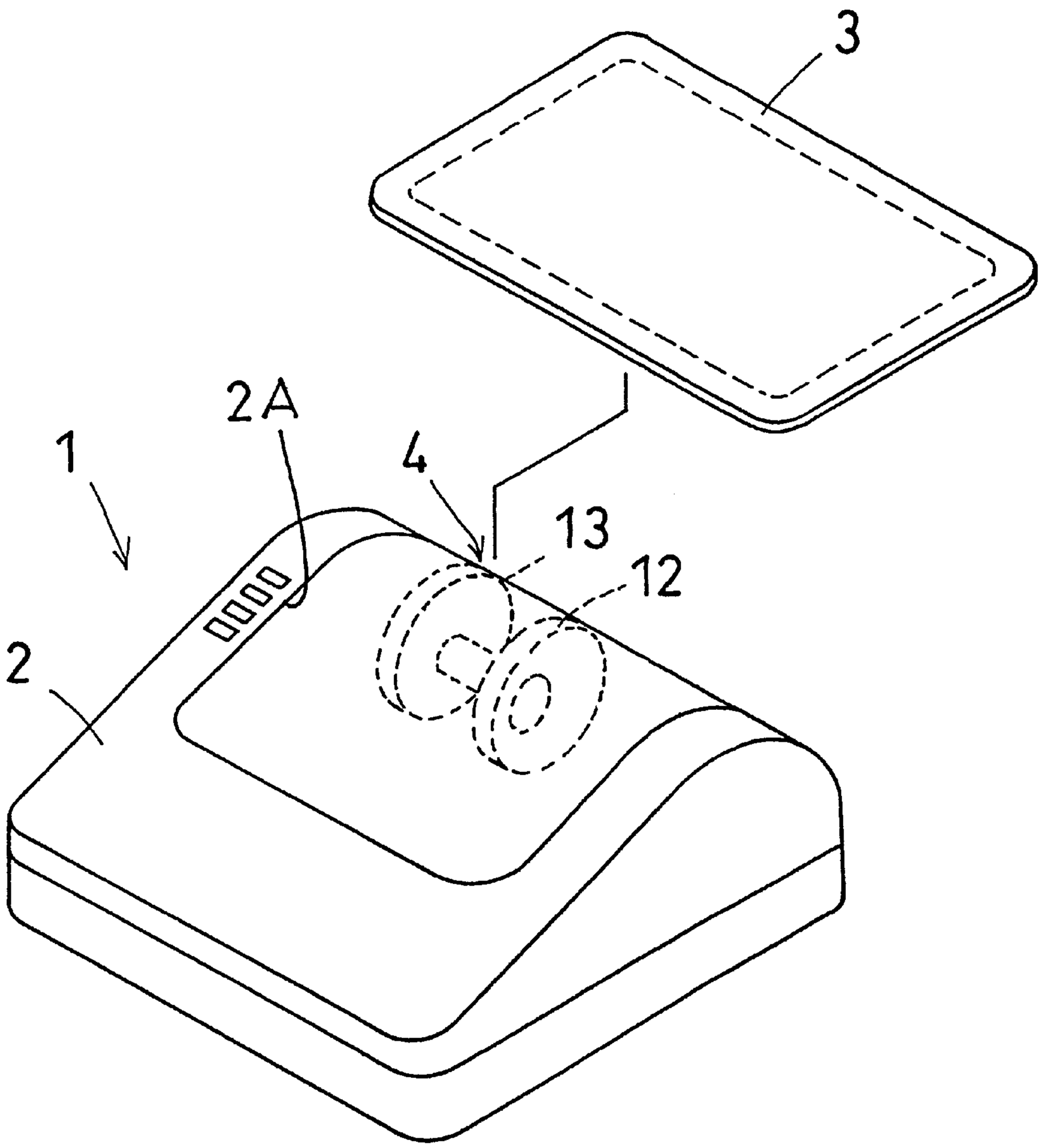


FIG. 3



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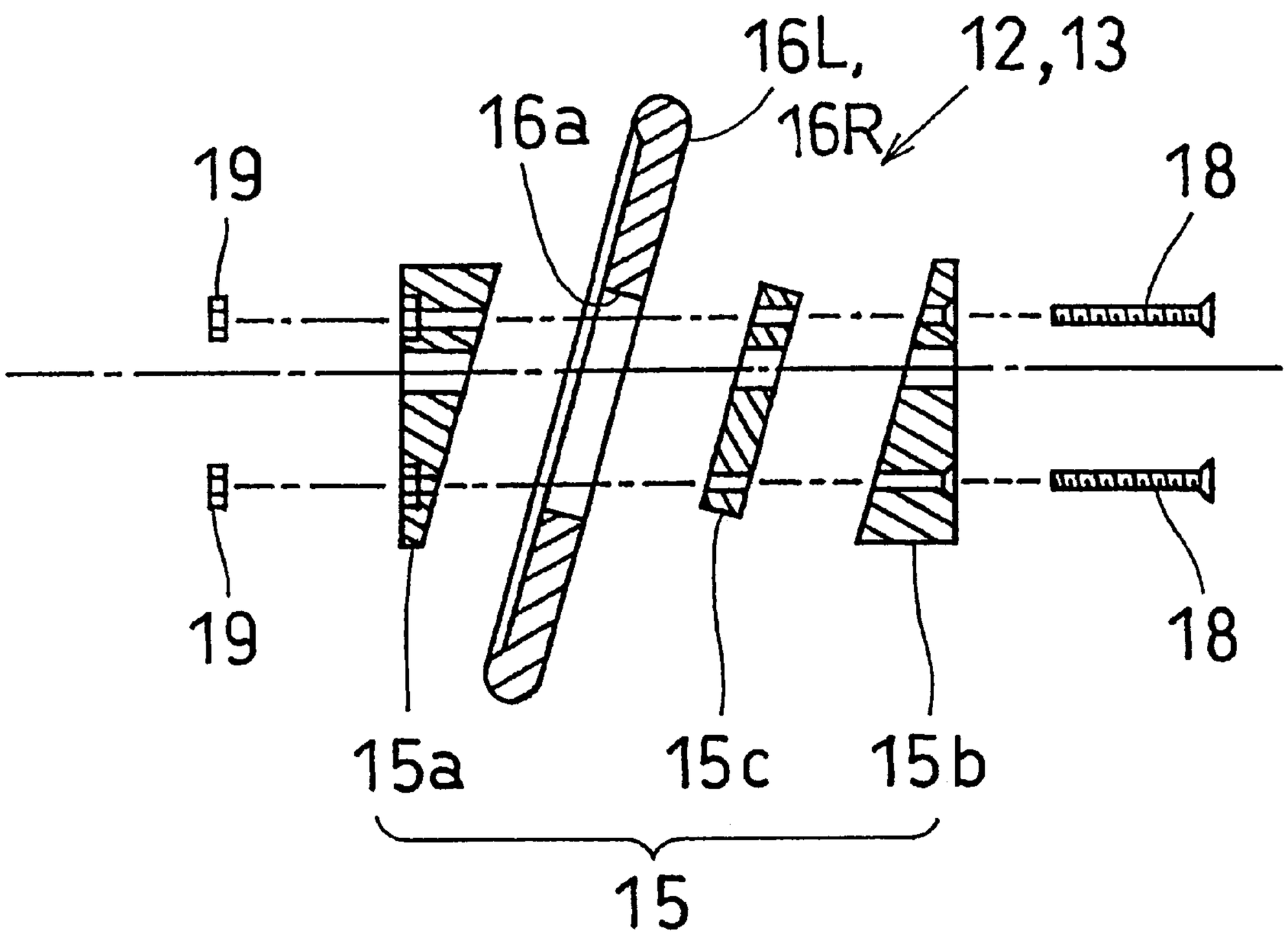


FIG. 5

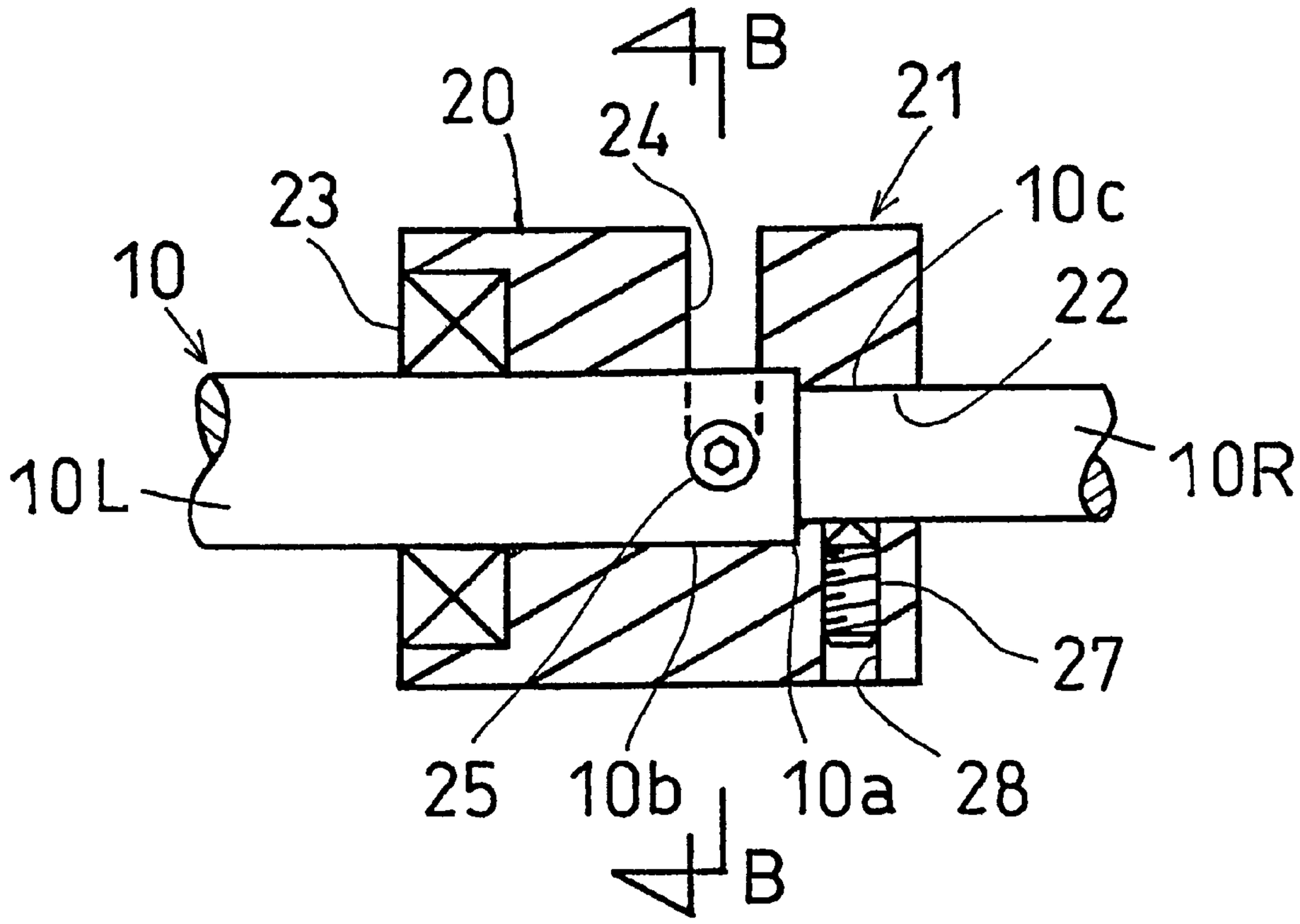

B
20
24
21
23
10c
10
22
10L
10R
27
25
10b
10a
28
B

FIG. 6

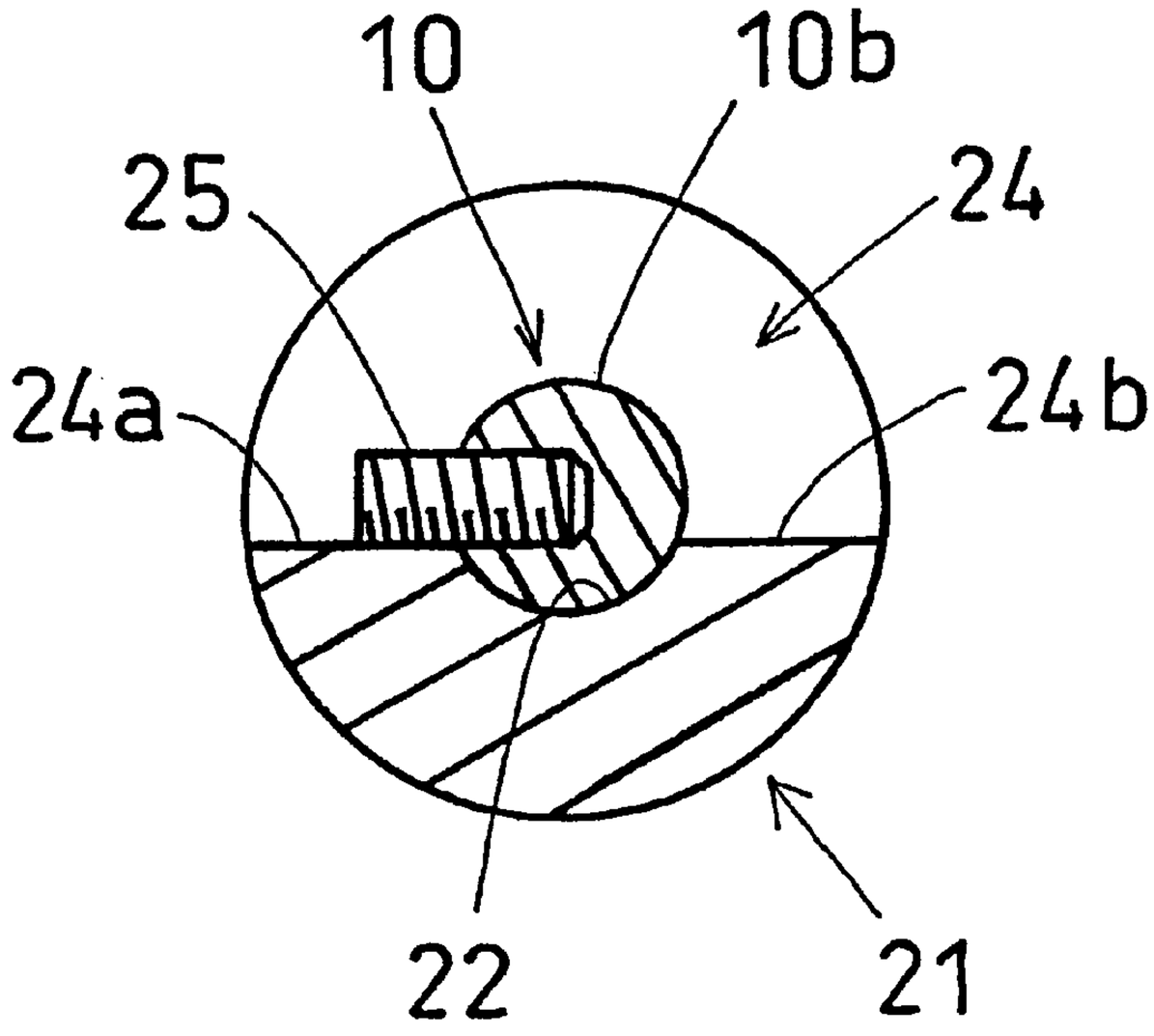

10
10b
25
24
24a
24b
22
21

FIG. 7

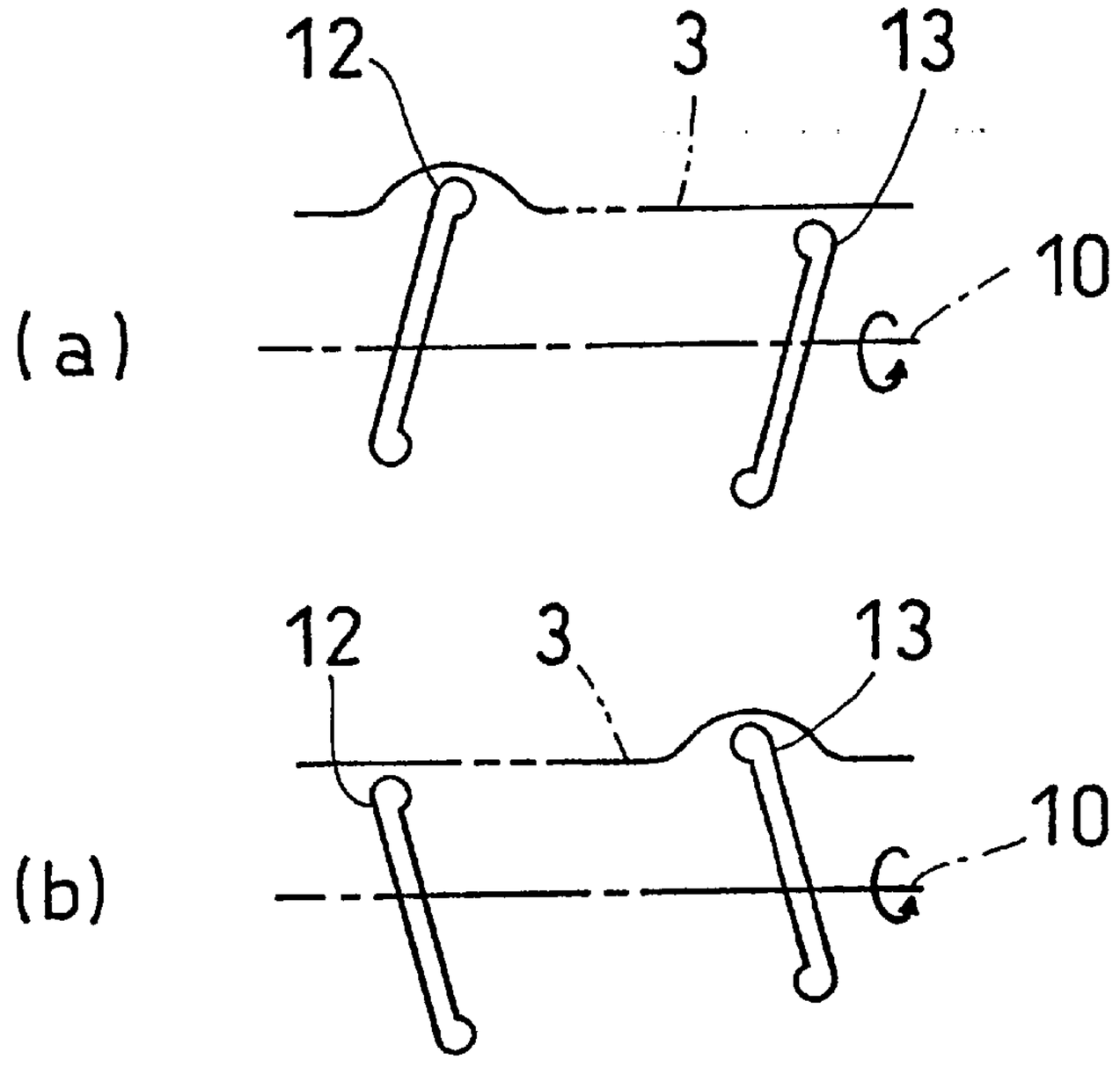


FIG. 8

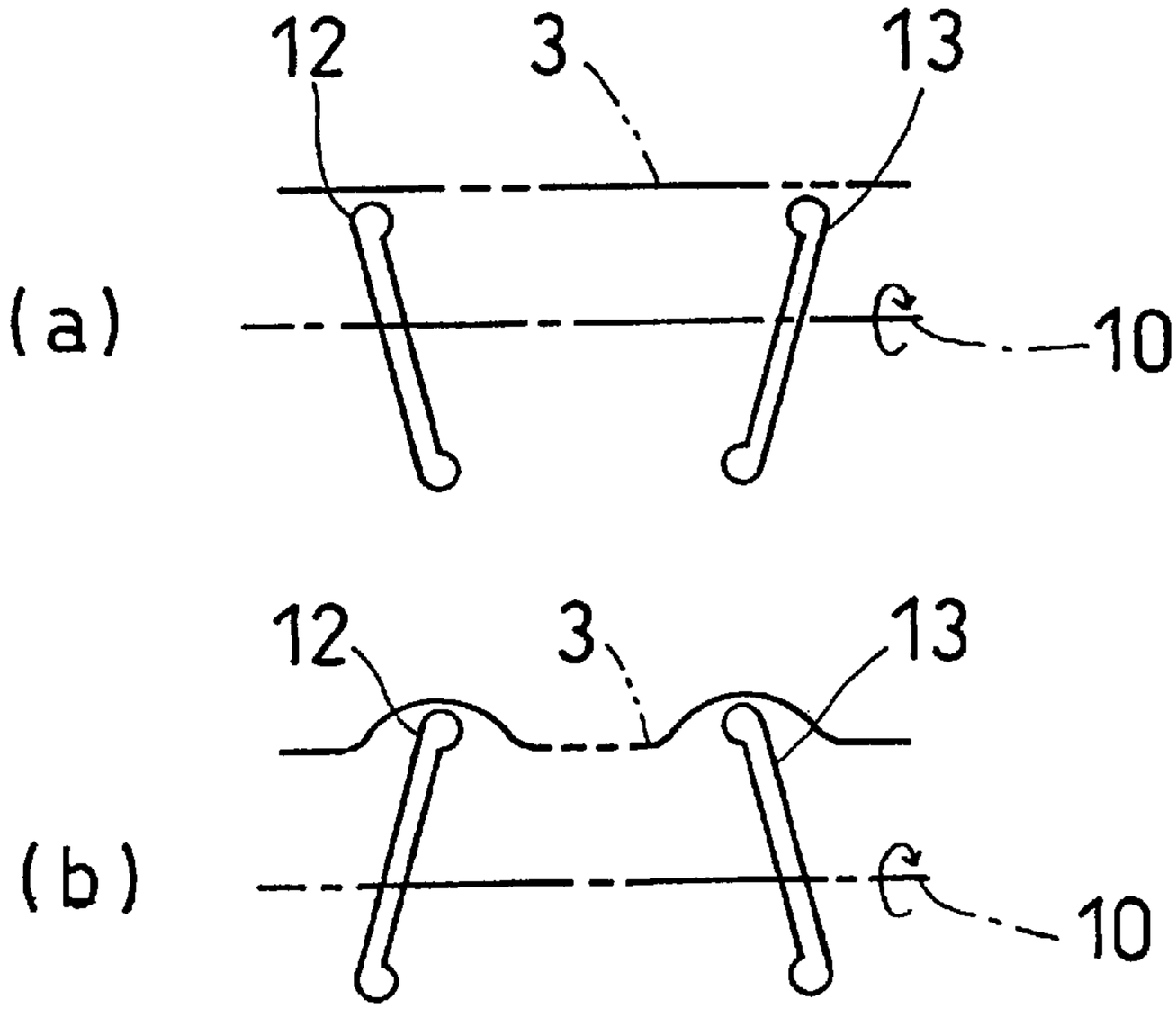
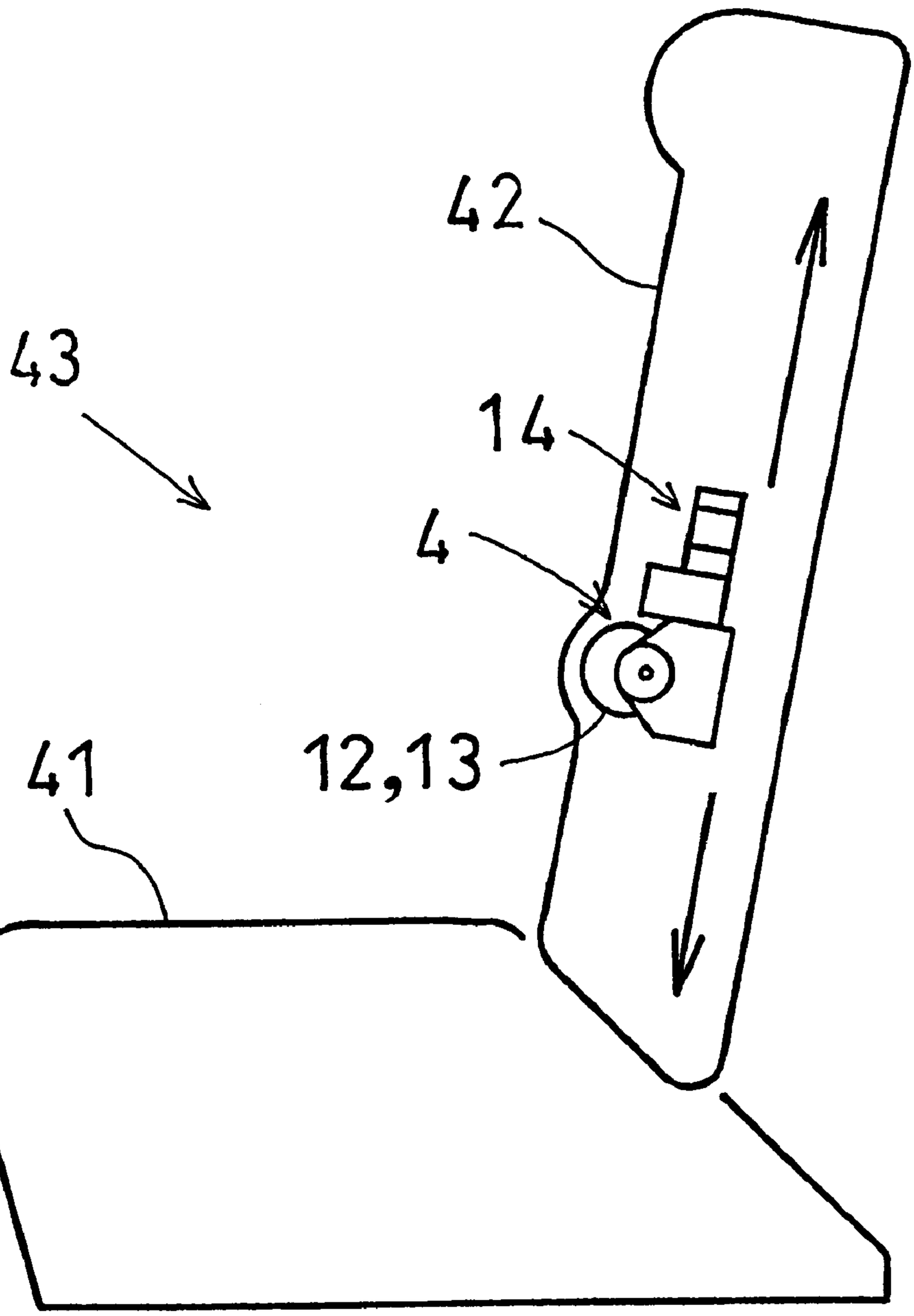


FIG. 9



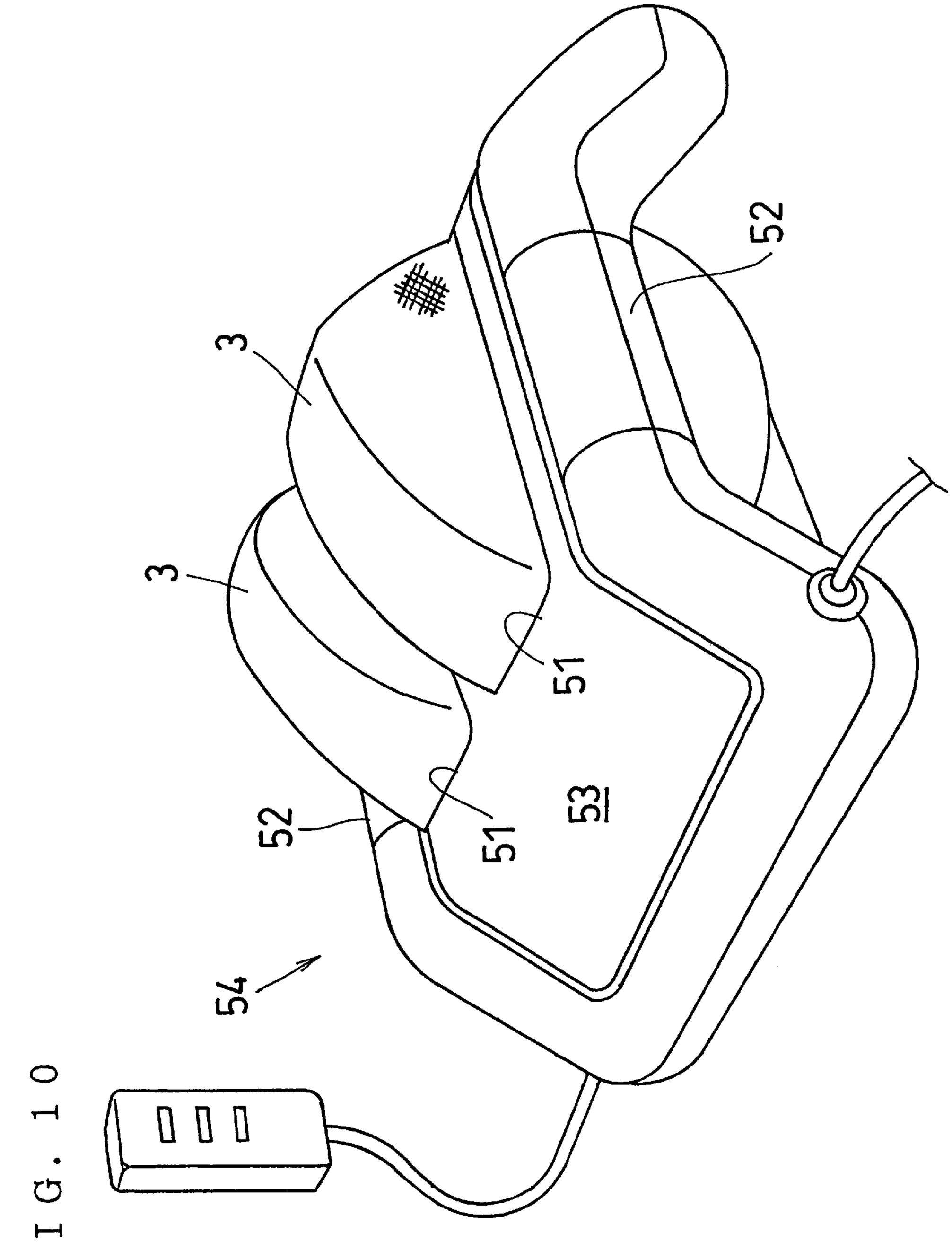


FIG. 10

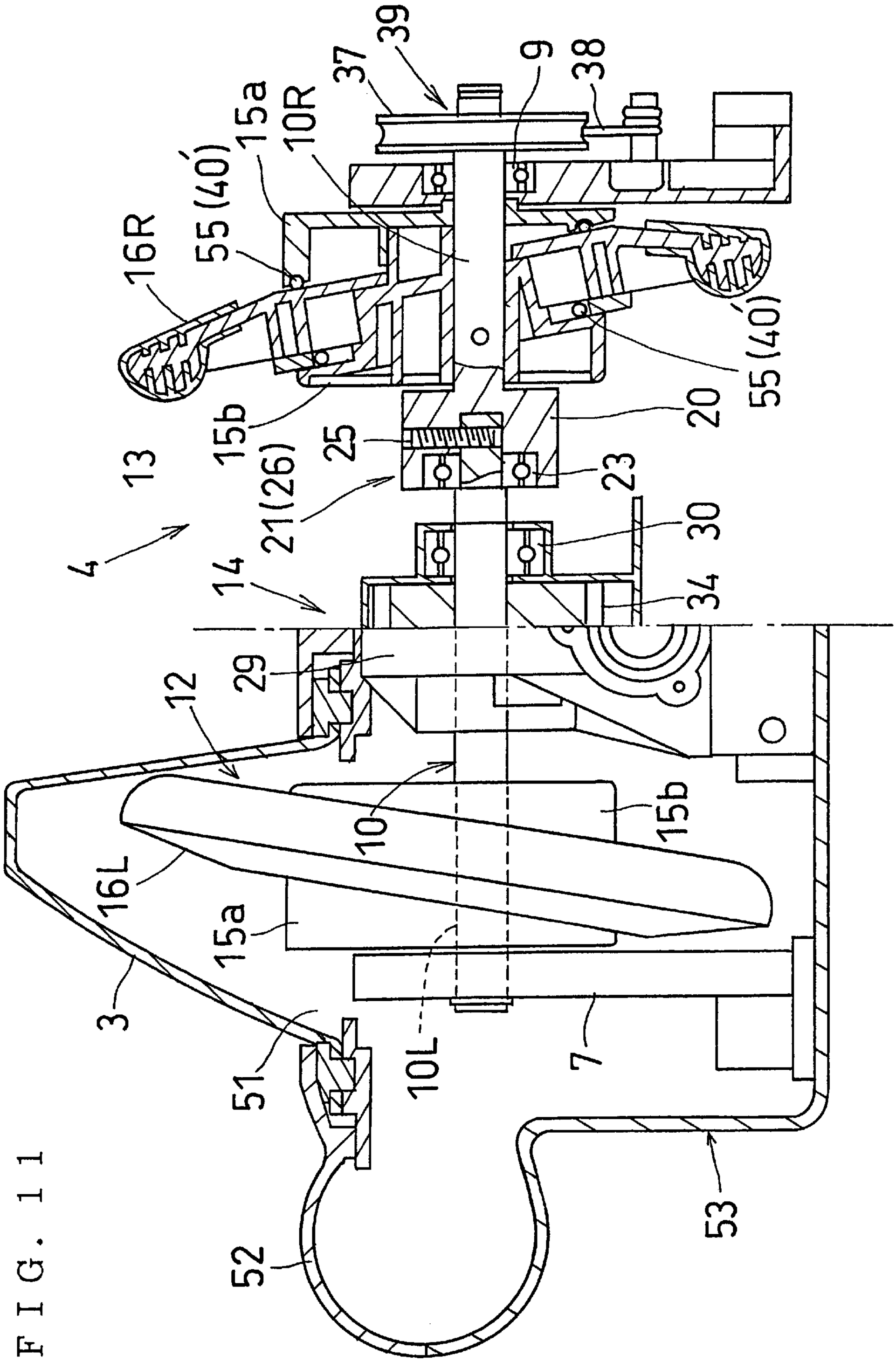

39
37
9
38
15a
10R
55 (40')
16R
55 (40')
15b
20
25
13
21(26)
23
4
30
14
34
12
29
10
15b
16L
15a
3
51
10L
7
52
53

FIG. 1

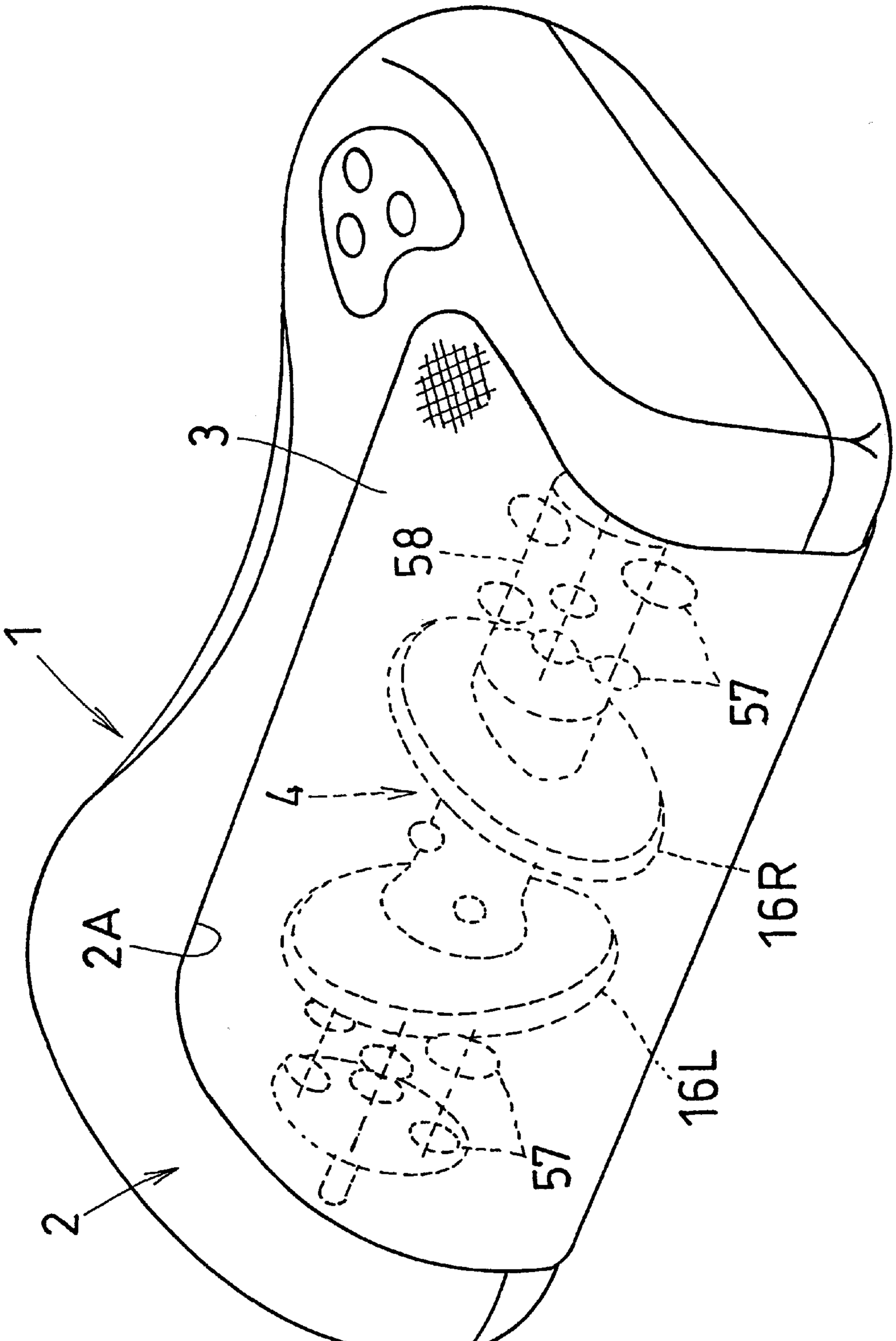


FIG. 12

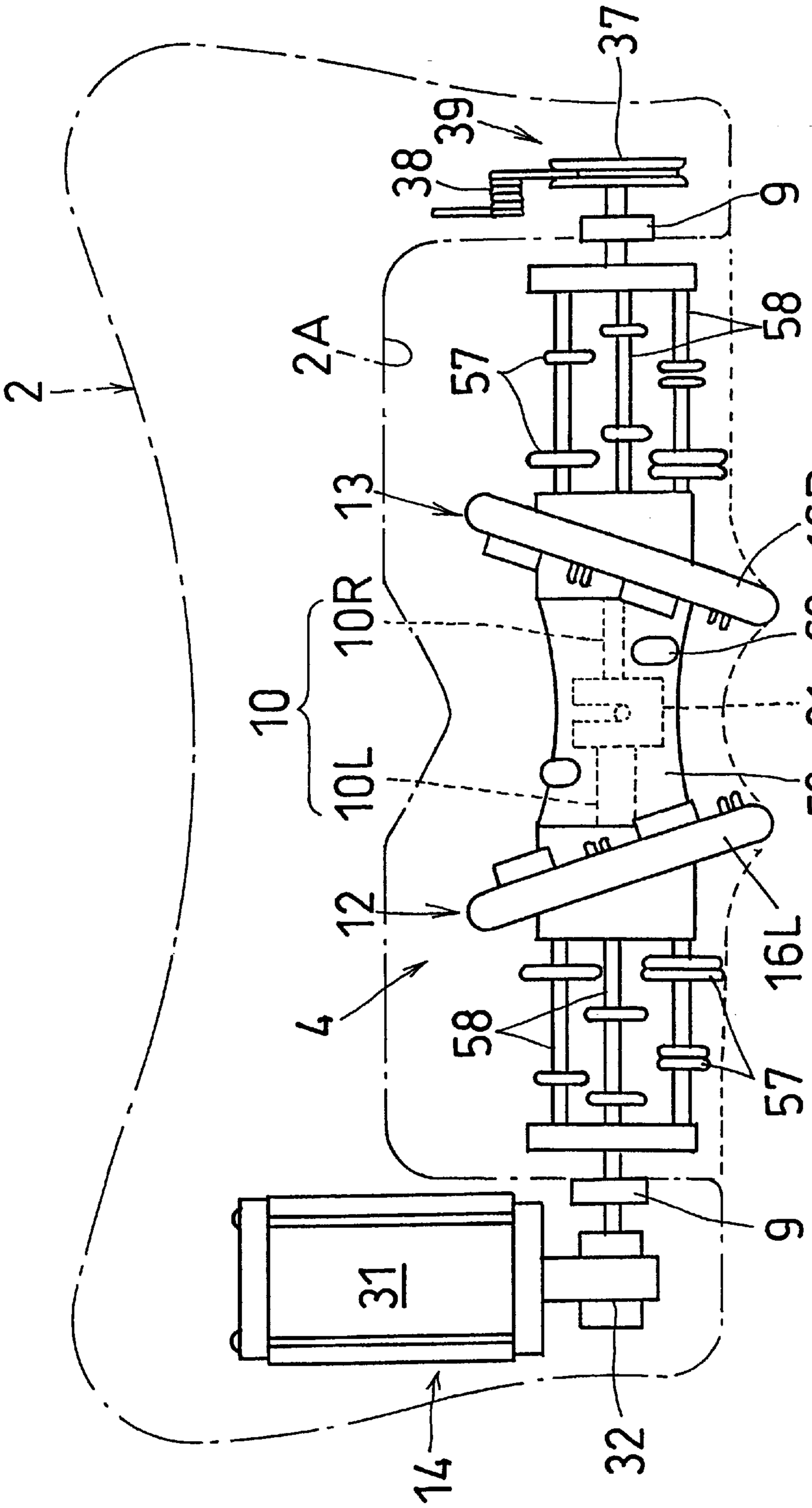

37
39
38
9
2
2A
57
58
13
16R
10R
60
10
21
10L
59
12
16L
4
58
57
9
31
14
32

FIG. 13

FIG. 14

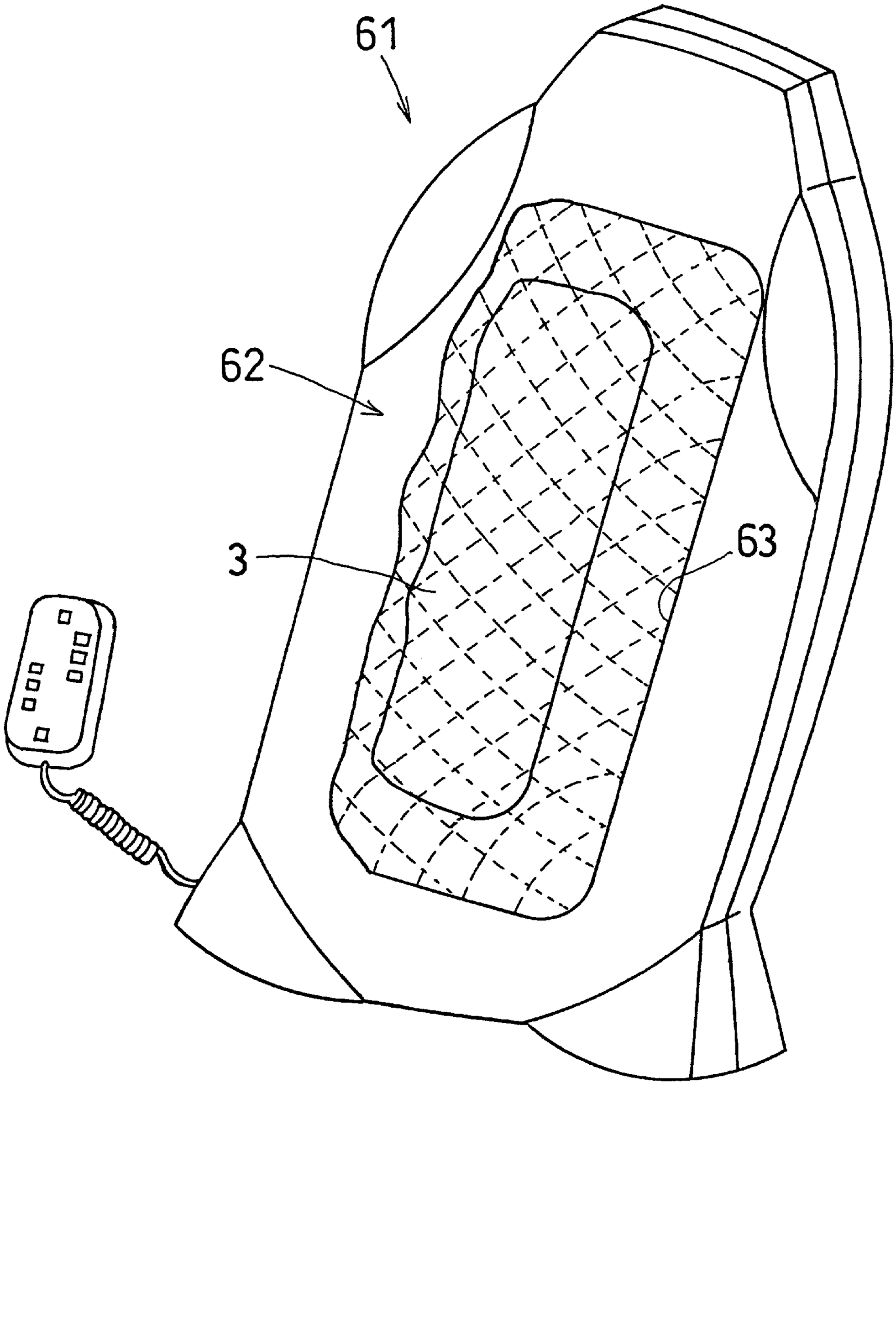


FIG. 15

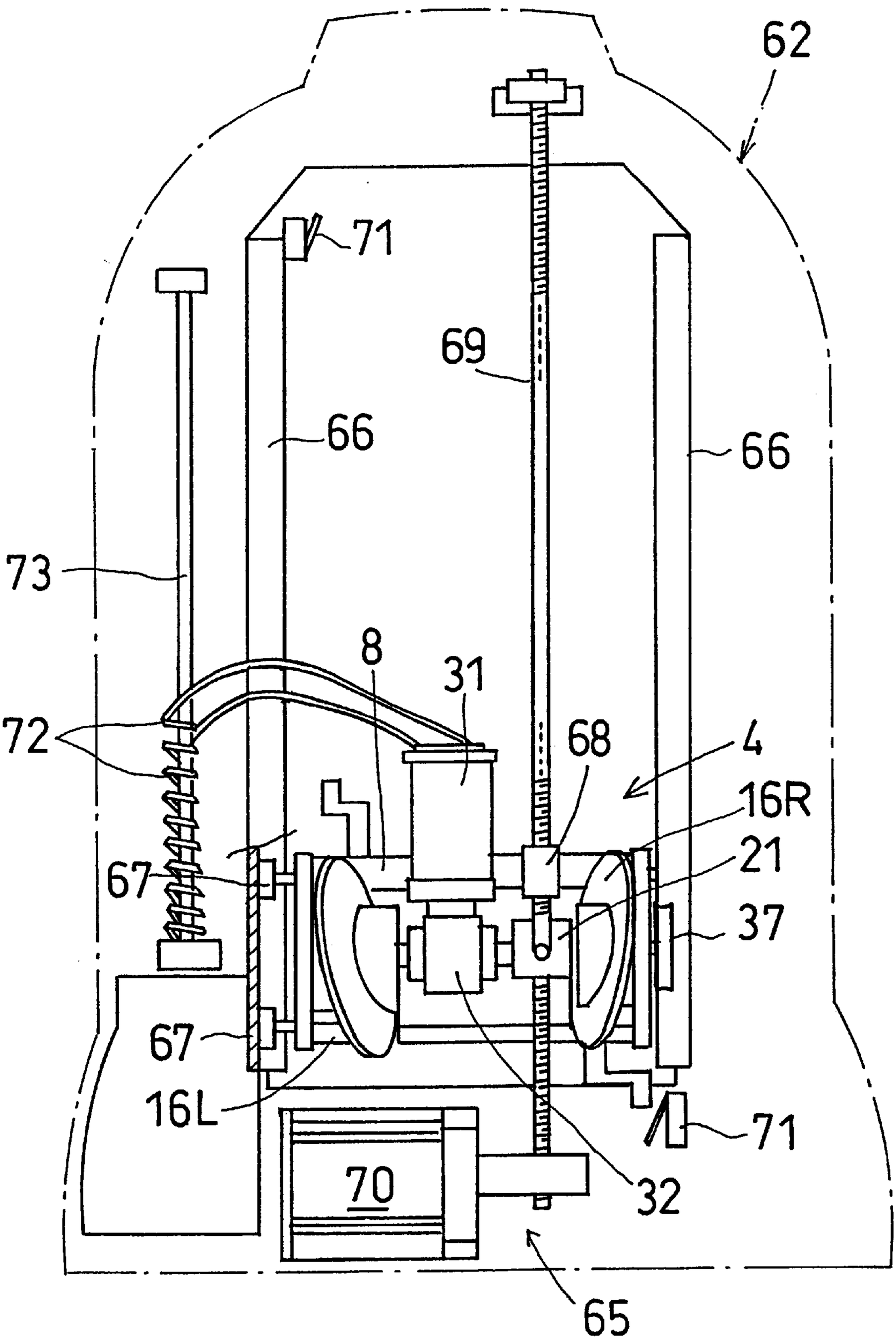


FIG. 16

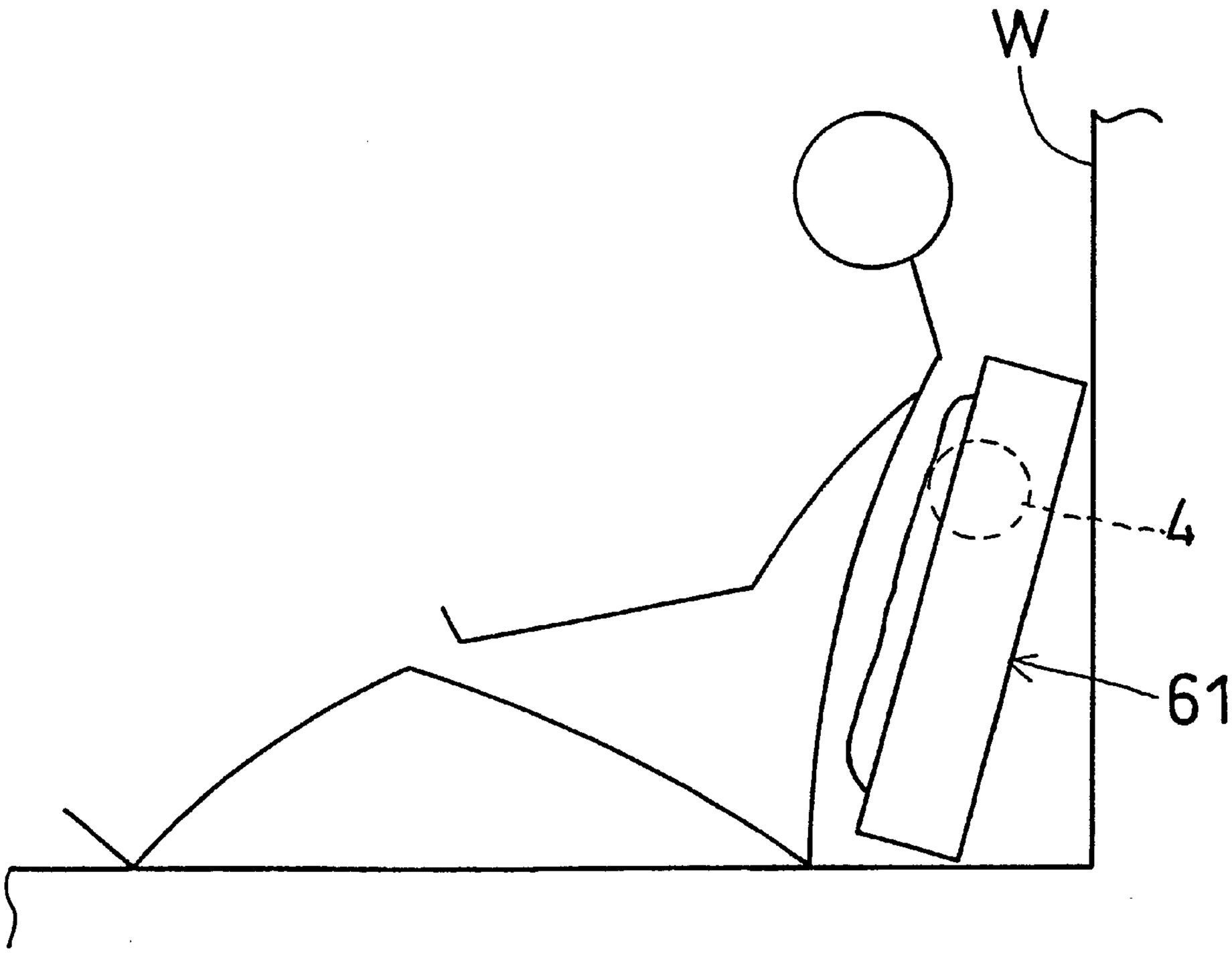
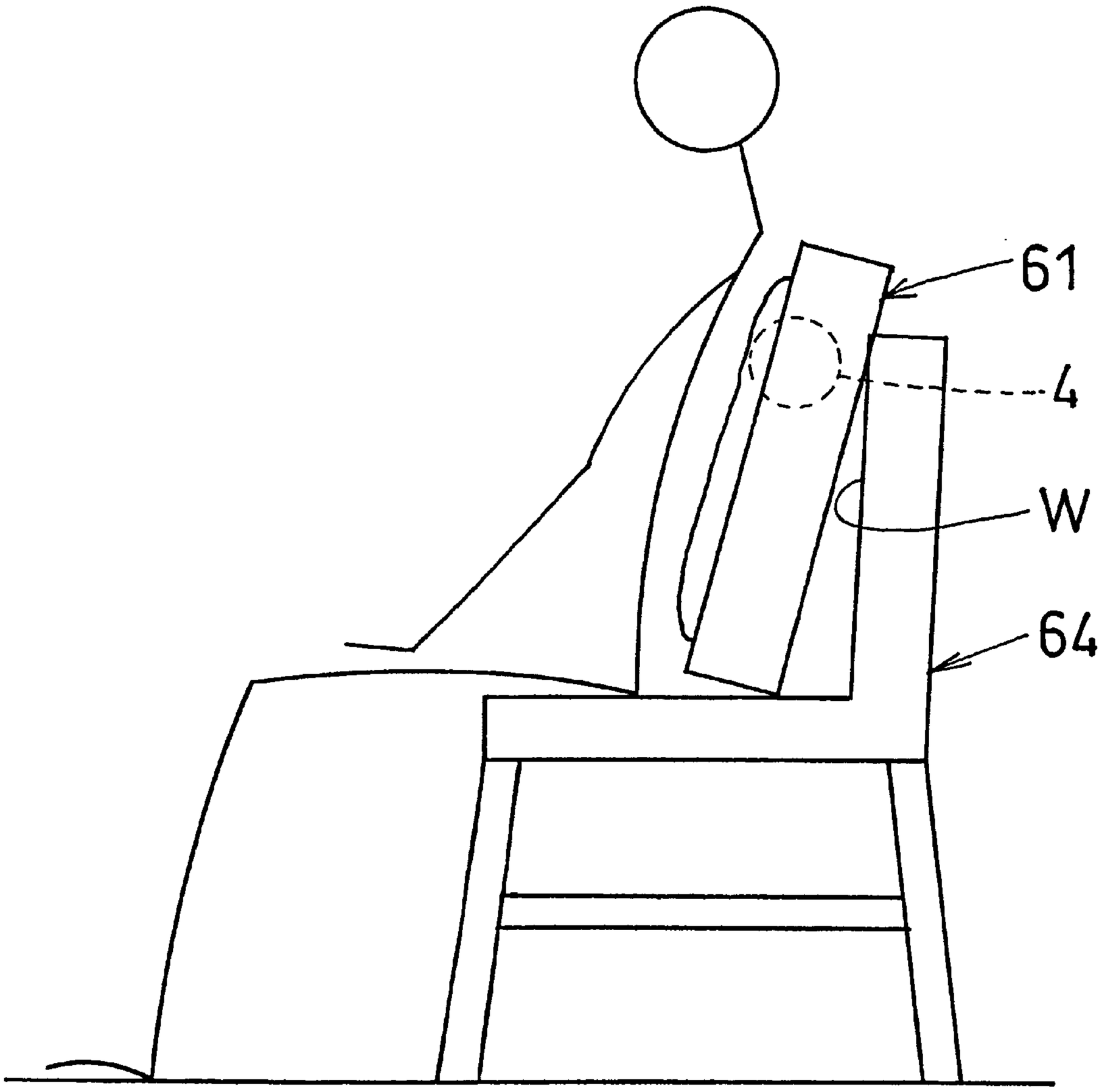


FIG. 17



ROLLER MASSAGING MECHANISM AND MASSAGING APPARATUS INCORPORATING THE SAME

This application is the national phase under 35 U.S.C. §371 of PCT International Application No. PCT/JP99/01340 which has an International filing date of Mar. 17, 1999 which designated the United States of America.

TECHNICAL FIELD

The present invention relates to a roller massaging mechanism capable of performing a variety of massaging operations for a human and massaging apparatus incorporating such mechanism.

BACKGROUND ART

Conventional massaging apparatus incorporating a roller massaging mechanism include a bed-type one as described, for example, in Japanese Unexamined Patent Publication No. SHO 59-28963 and a relatively compact stationary-type one as described, for example, in Japanese Examined Patent Publication HEI No. 4-78307 or Japanese Unexamined Utility Model Publication No. HEI 2-109628.

The bed-type massaging apparatus includes a roller massaging mechanism which is shiftable in the longitudinal direction of the bed. The massaging mechanism comprises a transversely extending rotary shaft capable of moving longitudinally of the bed, and a pair of right and left massaging rollers mounted on the rotary shaft as slanted relative to the axis of the rotary shaft, the rollers being slanted opposite to each other.

The aforementioned stationary-type massaging apparatus comprises a compact stationary-type casing having an opening oriented upward and a roller massaging mechanism disposed in the casing. In this arrangement, the roller massaging mechanism comprises a rotary shaft rotatably supported by the casing, and a pair of right and left disc-shaped massaging rollers mounted on the rotary shaft at an intermediate location corresponding to the opening, the pair of right and left massaging rollers being mounted as slanted relative to the axis of the rotary shaft in opposite directions.

Since the pair of right and left massaging rollers are slanted opposite to each other in the roller massaging mechanism, the distance between the peripheries of the massaging rollers is widened and narrowed as the rotary shaft rotates, whereby when the massaging rollers are pressed against an affected part of a user, they perform a kneading massage.

In the conventional roller massaging mechanism, however, the pair of right and left massaging rollers are fixed on the rotary shaft as slanted opposite to each other and, hence, the slanting direction of each roller relative to the rotary shaft cannot be varied, thus providing the kneading massage only.

Accordingly, the conventional massaging mechanism capable of performing only the kneading massage with the pair of right and left slanted massaging rollers cannot meet users' diversified needs and tends to let users lose their interest easily.

Although a variety of massaging apparatus performing various massaging operations as well as the kneading massage have been suggested, such massaging apparatus generally have a complicated structure in the drive system of massaging members or in the control program for performing various massaging operations and, hence, are large in size and expensive.

The present invention has been accomplished in view of the above circumstances, and it is an object of the present invention to provide a roller massaging mechanism which can perform, as well as the kneading massage, other massaging operations with a less complicated structure, and massaging apparatus incorporating such mechanism.

DISCLOSURE OF INVENTION

The present invention provides the following technical means to attain the above objects.

A roller massaging mechanism according to the present invention is of a type having a pair of right and left massaging rollers mounted on an intermediate portion of a rotary shaft in a slanted fashion relative to an axis of the rotary shaft, and includes switching means for selectively switching the position of the pair of right and left massaging rollers into one of a kneading position where the pair of massaging rollers are slanted opposite to each other and a non-kneading position where they are slanted parallel with each other.

The switching means may be, for example, a mechanical structure in which the position of the massaging rollers is changed by switching the rotational direction of the rotary shaft (for example, a half-turn clutch as described later), but is not limited to this structure.

With this arrangement, when the massaging rollers are slanted in the same direction to assume the non-kneading position, the outer peripheries of the massaging rollers move their points of contact with an affected part to the right and left while maintaining a predetermined spacing therebetween, resulting in a massaging operation other than the kneading massage.

On the other hand, when the rotary shaft is rotated with the massaging rollers assuming the kneading position, the outer peripheries of the massaging rollers move their points of contact with the affected part toward and away from each other, thereby performing the kneading massage relative to the affected part.

The present invention recommends that the pair of right and left massaging rollers be mounted eccentrically relative to the rotary shaft such that a portion of one massaging roller which is closer to a corresponding portion of the other massaging roller becomes more distant from the rotary shaft than a portion of said one massaging roller which is more distant from a corresponding portion of said other massaging roller.

With this eccentric arrangement, rotation of the rotary shaft with the massaging rollers in the non-kneading position causes the massaging rollers to perform a massaging operation such that the respective outer peripheries of the massaging rollers repeatedly reciprocate against an affected part alternately with each other. When the rotary shaft rotates at a relatively low speed, such alternating reciprocation of the outer peripheries of the massaging rollers is equivalent to pressing the affected part slowly (finger pressure-like massage) while when the rotary shaft rotates at a relatively high speed, it is equivalent to tapping the affected part (tapping massage).

Accordingly, the present invention provides not only the kneading massage but also the finger pressure-like massage or the tapping massage by the use of the massaging rollers only, thereby realizing the roller massaging mechanism capable of performing the kneading massage and other massaging operations with a less complicated structure and lower cost.

The change of the rotational speed of the rotary shaft can be achieved by imparting the drive means with a function of

varying the rotational speed of the rotary shaft to at least two levels when the pair of right and left massaging rollers are in the non-kneading position.

More specific modes of the roller massaging mechanism according to the present invention are as follows.

The rotary shaft according to the present invention may be divided into a first shaft portion supporting one massaging roller and a second shaft portion supporting the other massaging roller and disposed coaxially with the first shaft portion. In this case, the switching means may comprise a half-turn clutch which restricts relative rotation between the first shaft portion and the second shaft portion to about a half turn.

In this arrangement, when the direction of the rotation of, for example, the first shaft portion is switched by the drive means, the position of the second shaft portion relative to the first shaft portion for rotation is changed by a half turn. Thus, the position of the massaging rollers can be switched to one of the kneading position and the non-kneading position selectively by simply rotating the rotary shaft forwardly or backwardly by means of the drive means, thereby extremely facilitating the switching and controlling of the position of the massaging rollers.

More specifically, the half-turn clutch may include a tubular member unrotatably and coaxially secured to an end portion of the second shaft portion and defining in an outer periphery thereof a transverse slot having a length circumferentially of the tubular member which corresponds to the half turn; and a stopper pin projecting radially outwardly of an end portion of the first shaft portion rotatably and coaxially inserted into the tubular member and having a tip portion staying within the transverse slot.

Where the rotary shaft is divided into the first shaft portion and the second shaft portion, which are then interconnected through the half-turn clutch as described above, too easy of a relative rotation between the first and second shaft portions would cause the driven shaft portion to rotate relative to the driving shaft portion undesirably due to the pressure imposed on the massaging rollers from an affected part of the user, thereby rotating the massaging rollers with their kneading or non-kneading position instantaneously collapsed, which may result in a case where a proper massaging operation becomes impossible.

Therefore, it is recommended that brake means be provided for applying a frictional resistance against rotation of one of the first and second shaft portions which is situated on a driven side that is not directly rotary-driven by the drive means.

In this case, though the massaging roller supported by the driven shaft portion receives pressure from the affected part, a braking member restrains the second shaft portion from rotating relative to the first shaft portion thereby preventing the collapse of the kneading or non-kneading position of the massaging rollers, hence allowing for a proper massage operation with the massaging rollers maintained in the kneading or non-kneading position properly.

Further, though it is preferred that the pair of right and left massaging rollers are coupled to the rotary shaft so as to be rotatable relative to the rotary shaft for preventing unnecessary friction against the affected part and the cover member, too easy of a rotation of the massaging rollers relative to the rotate shaft would cause the massaging rollers to change their slanted direction(s) instantaneously due to the pressure received from the affected part, which may also result in an improper massage operation.

Therefore, it is recommended that second brake means be provided for applying a frictional resistance against the rotation of the pair of right and left massaging rollers relative to the rotary shaft.

The roller massaging mechanism of the present invention does not exclude any additional massaging member other than the pair of right and left massaging rollers.

For example, it is possible to provide a multiplicity of mini-rollers around a portion of the rotary shaft situated closer to each end of the rotary shaft than a portion of the rotary shaft on which the pair of right and left massaging rollers are mounted, for performing a rolling massage relative to an affected part. With this arrangement the user can enjoy, in addition to the kneading massage and finger pressure-like massage by the pair of right and left massaging rollers, the rolling massage by the multiplicity of mini-rollers if the affected part is moved closer to each end of the rotary shaft.

The roller massaging mechanism according to the present invention may be incorporated in various types of massaging apparatus such as relatively small massaging apparatus of stationary type or hand-carriable type, and relatively large massaging apparatus of leaner type or chair type.

Where the roller massaging mechanism is incorporated in massaging apparatus of the leaner type or chair type, it is preferred that shift means be provided for shifting the roller massaging mechanism upwardly and downwardly so as to massage a larger longitudinal extent of the back of a human.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a front view of a roller massaging mechanism as viewed from line A—A in FIG. **2**;

FIG. **2** is a side sectional view of a massaging apparatus as viewed from the left-hand side in FIG. **3**;

FIG. **3** is a perspective view of the massaging apparatus of stationary type;

FIG. **4** is an exploded sectional view of a rotor;

FIG. **5** is an enlarged sectional view showing a half-turn clutch;

FIG. **6** is a sectional view taken along line B—B in FIG. **5**;

FIG. **7** is a schematic view illustrating the massaging operation of massaging rollers in a non-kneading position;

FIG. **8** is a schematic view illustrating the massaging operation of massaging rollers in a kneading position;

FIG. **9** is a schematic side view showing a chair-type massaging apparatus;

FIG. **10** is a perspective view showing a hand-carriable massaging apparatus;

FIG. **11** is a front sectional view showing the hand-carriable massaging apparatus;

FIG. **12** is a perspective view showing another stationary-type massaging apparatus;

FIG. **13** is a plan view showing the inner structure of the stationary-type massaging apparatus;

FIG. **14** is a perspective view showing a leaner-type massaging apparatus;

FIG. **15** is a front view showing the inner structure of the leaner-type massaging apparatus; and

FIG. **16** and FIG. **17** are side views showing examples of use of the leaner-type massaging apparatus.

BEST MODE FOR CARRYING OUT INVENTION

The present invention will now be described with reference to the drawings.

FIGS. **1** to **8** show a first embodiment of the present invention.

FIG. **3** illustrates an example of massaging apparatus **1** incorporating therein roller massaging mechanism **4** according to the present invention. The massaging apparatus **1** shown is of a stationary type which is relatively compact and flat.

This stationary-type massaging apparatus **1** includes a stationary-type casing **2** defining an opening **2**A oriented upwardly, and the roller massaging mechanism **4** housed in the casing **2**, the opening **2**A being closed with a flexible cover member **3** formed of a stretch fabric or the like. The massaging apparatus **1** can be used by, for example, being placed under the back, waist, thighs or calves of a human lying on his or her back, or under the feet of a human sitting on a chair.

As shown in FIGS. **1** and **2**, the roller massaging mechanism **4** includes a support frame **8** having at right and left ends thereof right and left support brackets **7**,**7** with a predetermined spacing therebetween, a rotary shaft **10** extending between and rotatably supported by the brackets **7**,**7** of the support frame **8** through bearings **9**, a pair of right and left rotors **13** and **12** mounted on the rotary shaft **10** in a slanted fashion relative to the axis of the rotary shaft **10**, and drive means **14** for rotary-driving the rotary shaft **10**.

The right and left rotors **13**,**12** are arranged in the casing **2** at a location corresponding to the opening **2**A and include respective boss portions **15** fitted around the rotary shaft **10** eccentrically therewith, and respective massaging rollers **16**R,**16**L which are each in a substantially discoid configuration and held by the corresponding boss portions **15** as slanted relative to the axis of the rotary shaft **10**.

As shown in FIG. **4**, each of the boss portions **15** includes a pair of sandwiching plates **15***a* and **15***b* each in the form of a section of a cylinder sectioned askew relative to the axis of the cylinder, and a central plate **15***c* held as sandwiched by these sandwiching plates **15***a* and **15***c*.

These plates **15***a*, **15***b* and **15***c* are integrated together into each boss portion **15** by placing the sandwiching plates **15***a* and **15***b* on opposite sides of each massaging roller **16**R,**16**L centrally receiving the central plate **15***c* and then fastening the plates **15***a*, **15***b* and **15***c* with use of a bolt extending through these three plates and a nut.

The boss portions **15** are each prevented from rotating relative to the rotary shaft **10** by a relative rotation preventive structure not shown and hence are adapted to rotate together with the rotary shaft **10**.

The central plate **15***c* is shaped discoid with its opposite sides respectively abutting the slanted end faces of the sandwiching plates **15***a* and **15***b*. Thus, the central plate **15***c* is slanted relative to the axis of the rotary shaft **10**. It should be noted that the central plate **15***c* may be formed integrally with one of the sandwiching plates **15***a* and **15***b*, or alternatively the central plate **15***c* may be composed of mating halves cut at the center of the thickness of the plate **15***c* which are formed integrally with the sandwiching plates **15***a* and **15***b*, respectively.

The massaging rollers **16**R, **16**L are each shaped discoid defining a central hole **16***a* in a central portion thereof for slidably receiving the central plate **15***c* for rotation relative to the central plate **15***c*. Thus, the massaging rollers **16**R, **16**L are rotatably coupled to the rotary shaft **10** as slanted relative to the axis of the rotary shaft **10**.

As shown in FIG. **1**, the rotary shaft **10** includes a first shaft portion **10**L supporting the-left massaging roller **16**L, and a second shaft portion **10**R supporting the right massaging roller **16**R, the second shaft portion **10**R being coaxially aligned with the first shaft portion **10**L. The first shaft portion **10**L has a portion for mounting the left rotor **12** and a portion extending through the drive means **14** in this order from the left, while the second shaft portion **10**R has a portion for mounting the right rotor **13**.

The rotary shaft **10** is divided into the first and second shaft portions **10**L and **10**R at a dividing end **10***a* located between the drive means **14** and the right rotor **13**. Dividing end portions **10***b* and **10***c* of the first and second shaft portions **10**L and **10**R are interconnected through a half-turn clutch **21**.

As shown in FIGS. **5** and **6**, the half-turn clutch **21** includes a tubular member **20** unrotatably and coaxially secured to the dividing end portion **10***c* of the second shaft portion **10**R, and a stopper pin **25** projecting radially outwardly of the dividing portion **10***b* of the first shaft portion **10**L coaxially and rotatably inserted into the tubular member **20**.

The tubular member **20** is shaped cylindrical having a bore **22** axially extending through a central portion thereof, and a bearing **23** located on a peripheral edge portion of the opening adjacent the drive means **14** (on the left-hand side in FIG. **5**) for receiving the dividing end portion **10***b* of the first shaft portion **10**L for rotation. Further, the tubular member **20** is formed in an axially intermediate portion thereof with a semicircular transverse slot **24** which has a length circumferentially of the tubular member **20** corresponding to a half turn and which has a depth from the outer peripheral surface of the tubular member **20** to the bore **22**.

The stopper pin **25** is secured to the dividing end portion **10***b* of the first shaft portion **10**L by, for example, thread engagement of a setscrew so as to project radially outwardly, and the tip portion of the pin **25** movably stays within the transverse slot **24**.

The tubular member **20** defines in a right-hand side end portion thereof a tapped hole **28** for thread engagement with a setscrew **27** preventing the dividing end portion **10***c* of the second shaft portion **10**R from rotating relative to the tubular member **20**.

As is apparent from the above, the first shaft portion **10**L of the rotary shaft **10** supporting the left rotor **12** is turnable relative to the tubular member **20** forming the half-turn clutch **21** within a range of a half turn, while the second shaft portion **10**R of the rotary shaft **10** supporting the right rotor **13** is secured to the tubular member **20** unrotatably relative thereto.

Accordingly, when the first shaft portion **10**L of the rotary shaft **10** is rotated counterclockwise in FIGS. **2** and **6** by the drive means **14**, the stopper pin **25** comes to abut one radial end face **24***a* of the semicircular transverse slot **24** thereby causing the second shaft portion **10**R to rotate counterclockwise together with the first shaft portion **10**L.

On the other hand, when the first shaft portion **10**L is rotated clockwise from the condition where the stopper pin **25** abuts the radial end face **24***a*, the stopper pin **25** moves within the transverse slot **24** to abut the other radial end face **24***b* of the slot **24** thereby causing the second shaft portion **10**R to rotate clockwise together with the first shaft portion **10**L.

As the stopper pin **25** moves from the radial end face **24***a* to the opposite radial end face **24***b*, the right rotor **13** mounted on the second shaft portion **10**R on the driven side makes a half turn relative to the left rotor **12**.

As a result, the respective massaging rollers **16**R, **16**L of the right and left rotors **13** and **12** can assume a non-

kneading position where the two massaging rollers **16**L and **16**R are slanted in the same direction parallel with each other as indicated in solid line or alternatively a kneading position where the two massaging rollers **16**L and **16**R are slanted in opposite directions as indicated in phantom line of FIG **1**.

In this way the half-turn clutch **21** forms switching means **26** for selectively switching the position of the massaging rollers **16**R, **16**L into one of the kneading position where the pair of opposite massaging rollers **16**L and **16**R are slanted opposite to each other and the non-kneading position where they are slanted in the same direction.

In the non-kneading embodiment the massaging rollers **16**R,**16**L are mounted eccentrically relative to the rotary shaft **10** such that, as illustrated in FIG. **7**(*a*), a lower portion of lower the right rotar **13** selectively becomes more distant from the rotary shaft **10** than a lower portion of lower the left rotar **12** by making the boss portion **15** of each rotor **12**,**13** eccentric relative to the rotary shaft **10**. As illustrated in FIG. **7**(*b*), by rotating the rotary shaft **10** counterclockwise, the lower end of the left rotor **12** selectively becomes more distant from the rotary shaft **10** than a lower portion of the right rotor **13**.

For this reason, when the rotary shaft is rotated with the massaging rollers **16**R,**16**L in the non-kneading position, they perform a massage operation such that the respective outer peripheries of the rollers **16**R, **16**L reciprocate against an affected part of the user's body alternately with each other, as shown in FIGS. **7**(*a*) and **7**(*b*). In this case it is preferred that the stroke between the outer periphery of each roller **16**R,**16**L be set to about 15 mm.

As shown in FIG. **2**, the drive means **14** includes a motor **31**, and a reduction gear device **32** for transmitting the driving power of the motor **31** to the rotary shaft **10** (first shaft portion **10**L) at a reduced speed, the reduction gear device **32** being either integral with or separate from the motor **31**.

As shown in FIG. **1**, the reduction gear device **32** includes a gear case **29** receiving therethrough the rotary shaft **10** via bearings **30** for rotation, a worm wheel **34** secured to a portion of the rotary shaft **10** situated within the gear case **29**, and a worm **35** secured to output shaft **33** of the motor **31** so as to mesh with the worm wheel **34**.

In this embodiment the motor **31** can revolve forwardly and backwardly by way of an electric control circuit not shown and, hence, the forward rotation of the rotary shaft **10** can be switched to the backward rotation, and vice versa.

The electric control circuit of the drive means **14** is capable of varying the rotary speed of the rotary shaft **10** to at least two levels when the massaging rollers **16**R,**16**L are in the non-kneading position. This speed varying operation may be effected stepwise or steplesswise. Further, the speed varying function may be controlled mechanically (including change of gear combination) instead of the electric control using the control circuit.

Where the massaging rollers **16**R,**16**L are in the non-kneading position (in the case of FIG. **7**), rotating the rotary shaft **10** at a relatively low speed causes the respective outer peripheries of the rollers **16**R,**16**L to reciprocate relatively slowly in an alternate fashion thereby providing a finger pressure-like massage such as to press an affected part heavily from the right and left.

To achieve such a finger pressure-like massage, the rotary speed of the rotary shaft **10** is set to about 50 rpm.

On the other hand, rotating the rotary shaft **10** at a relatively high speed with the massaging rollers **16**R,**16**L in the non-kneading position (in the case of FIG. **7**) causes the respective outer peripheries of the rollers **16**L,**16**R to reciprocate alternately at a higher speed thereby giving impacts to the affected part, thus resulting in a tapping massage.

To achieve such a tapping massage, the rotary speed of the rotary shaft **10** is set to 150 rpm or higher, and the rotary speed of 200 rpm provides the user with a particularly advantageous tapping massage.

When the rotary shaft **10** is rotated with the outer peripheries of the massaging rollers **16**R,**16**L abutting an affected part of the user, there is the possibility that the massaging roller **16**R supported on the second shaft portion **10**R situated on the driven side changes its slanted direction instantaneously due to the pressure from the affected part, resulting in an improper massage.

More specifically, since the first and second shaft portions **10**L and **10**R into which the rotary shaft **10** is divided are interconnected through the half-turn clutch **21**, too easy of a relative rotation between these shaft portions **10**L and **10**R would cause the second shaft portion **10**R to rotate relative to the first shaft portion **10**L undesirably due to the pressure imposed on the right massaging roller **16**R from the affected part thereby rotating the massaging rollers **16**R,**16**L with their kneading or non-kneading position instantaneously collapsed, thus resulting in a case where a proper massage becomes impossible.

Although the pair of massaging rollers **16**R,**16**L are preferably mounted for rotation relative to the rotary shaft **10** to prevent unnecessary friction between these rollers and an affected part of the user and between these rollers and the cover member **3**, too easy rotation of the massaging rollers **16**R,**16**L relative to the rotary shaft **10** would cause the massaging rollers **16**R,**16**L to change their slanted direction (s) instantaneously, which also results in an improper massage.

To prevent such inconveniences this embodiment is provided with first brake means **39** for providing a frictional resistance against rotation of the second shaft portion **10**R on the driven side which is not driven by the drive means **14**, and second brake means **40** for providing frictional resistance against rotation of the pair of massaging rollers **16**R,**16**L relative to the rotary shaft **10**.

The first brake means **39** comprises a friction wheel **37** attached to the projecting end of the second shaft portion **10**R, and a pressing spring **38** secured to the support bracket **7** so that an end portion thereof presses upon the outer periphery of the friction wheel **37**.

The second brake means **40** comprises pressing the respective slanted faces of the sandwiching plates **15***a* and **15***b* upon each massaging roller **16**R,**16**L with an appropriate pressure.

When the rotary shaft **10** of the massaging apparatus **1** of the above construction is rotated counterclockwise in FIGS. **2** and **6**, the massaging rollers **16**R,**16**L of the rotors **13** and **12** rotate in the non-kneading position where the massaging rollers **16**R,**16**L are parallel with each other, with the result that the respective outer peripheries of the massaging rollers **16**R,**16**L alternately reciprocate against an affected part of the user.

In this case, adjusting the rotary speed of the rotary shaft **10** to a relatively low speed (about 50 rpm) realizes the finger pressure-like massage in which the massaging rollers **16**R,**16**L alternately and slowly press the affected part. Alternatively, adjusting the rotary speed of the rotary shaft **10** to a relatively high speed (150 rpm or higher, advantageously about 200 rpm) realizes the tapping massage where

the massaging rollers **16**R, **16**L alternately give impacts to the affected part.

On the other hand, when the rotary shaft **10** is rotated clockwise in FIGS. **2** and **6**, the massaging rollers **16**R,**16**L of the rotors **13** and **12** rotate in the kneading position, with the result that the respective outer peripheries of the massaging rollers **16**R,**16**L expand while gradually coming closer to each other and subsequently retract while going away from each other as shown in FIG. **8**, thereby providing the kneading massage.

It should be noted that the rotary speed of the rotary shaft **10** is preferably set within a range from about 50 to about 60 rpm in the kneading massage.

The massaging apparatus **1** according to this embodiment is capable of selectively performing the kneading massage and other massaging operations by simply switching the rotational direction of the rotary shaft **10**. Further, by simply varying the rotary speed of the rotary shaft **10** when the massaging rollers **16**R,**16**L are in the non-kneading position, the massage apparatus **1** can selectively perform the finger pressure-like massage and the tapping massage. Thus, the massaging rollers **16** of a single kind allow for three different kinds of massaging operations.

FIG. **9** illustrates a second embodiment of the present invention.

This embodiment is a chair-type massaging apparatus **43** including a seat portion **41**, a backrest portion **42** extending upwardly from an end portion of the seat portion **41**, and the aforementioned roller massaging mechanism **4** shown in FIG. **1** and disposed within the backrest portion **42**.

It should be noted that the roller massaging mechanism **4** may be incorporated also in the seat portion **41** or in a footrest (not shown) as well as in the backrest portion **42**.

If shift means is provided for upwardly and downwardly shifting the roller massaging mechanism **4** disposed within the backrest portion **42**, it is possible to massage a larger extent of a user's body from the occiput portion through the back to the waist.

FIGS. **10** and **11** illustrate a third embodiment of the present invention.

This embodiment is a hand-carriable massaging apparatus **54** including a hand-carriable casing **53** having an opening **51** on a front side thereof (on the top side in FIG. **10**) and grip portions **52** on right and left lateral sides thereof, and the roller massaging mechanism **4** disposed in the casing **53**.

The casing **53** shown defines a pair of right and left openings **51**,**51** on the top side thereof through which the right and left massaging rollers **16**R,**16**L project upwardly from the casing **53**. The cover member **3** shown is divided into right and left separate ones for closing the openings **51**,**51**, respectively.

As shown in FIG. **11**, second brake means **40**' employed in this embodiment comprises a ring spring **55** disposed on opposite sides of each massaging rollers **16**R,**16**L. The ring spring **55** is inserted in a clearance between each sandwiching plate **15***a*, **15***b* and each massaging rollers **16**R,**16**L to provide a friction resistance against the rotation of the rollers **16**R,**16**L about the rotary shaft **10**.

The grip portions **52** are each a cylindrical portion formed integrally with each of the right and left lateral sides of the casing **53** for an operator to press the massaging apparatus **54** against the back of another person for massage by holding these portions **52** with both hands.

The massaging apparatus **54** according to this embodiment can rest on a floor or the like with the massaging rollers **16** oriented upwardly as shown in FIG. **10** and hence can be used also as a stationary-type massaging apparatus of a small size.

FIGS. **12** and **13** illustrate a fourth embodiment of the present invention.

Like the first embodiment, this embodiment also is a stationary-type massaging apparatus **1** including stationary-type casing **2** having an opening **2**A on the top side thereof, and roller massaging mechanism **4** housed in the casing **2**. The fourth embodiment is different from the first embodiment in the following points.

That is, the roller massaging mechanism **4** includes, as well as a pair of right and left massaging rollers **16**R,**16**L, a multiplicity of mini-rollers **57** disposed around a portion of the rotary shaft **10** situated closer to each end of the rotary shaft **10** than a portion thereof on which the massaging rollers **16**R,**16**L are mounted. The mini-rollers **57** are mounted with a predetermined spacing on a plurality of rotatable shafts **58** secured around the rotary shaft **10**.

With this arrangement if the user places his or her calves or the like on the massaging apparatus **1** at locations adjacent the opposite ends of the rotary shaft **10**, the user can enjoy a rolling massage performed by the multiplicity of mini-rollers **57** rolling on an affected part as well as a kneading massage or a like massage performed by the massaging rollers **16**.

In the massaging mechanism **4** employed in this embodiment drive means **14** comprising motor **31** and reduction gear device **32** is connected to the left end of the rotary shaft **10** and is disposed in a left portion of the casing **2** as shown.

Further, half-turn clutch **21** is covered with a sleeve **59** made of resin having massaging projections **60** on an outer periphery thereof, the sleeve **59** serving to prevent the half-turn clutch **21** from catching the cover member **3** therearound when the cover member **3** sags into the casing **2**.

FIGS. **14** to **17** illustrate a fifth embodiment of the present invention.

Massaging apparatus **61** according to this embodiment is of a leaner type including an independent one-piece casing **62** having a longitudinal length substantially corresponding to that of the back of a human and capable of leaning against a wall face W with its back side facing the wall face W, and the aforementioned roller massaging mechanism **4** longitudinally movably disposed in the casing **62**.

The overall configuration of the casing **62** used in this embodiment is a longitudinally elongated flat box having a longitudinally extending opening **63** on a front side thereof. The casing **62** is capable of leaning against wall face W defining a room as shown in FIG. **16**, or against wall face W of the backrest of a chair **64** as shown in FIG. **17**.

Since the casing **62** is of such a longitudinally elongated flat box configuration capable of leaning against the wall face W, the massaging apparatus **61** is able to massage the back of the user over a large extent as in the case of the chair-type massaging apparatus **43** if it is used when leaning against a wall face W as shown in FIG. **16** or **17**.

On the other hand, since the casing **62** is of the longitudinally elongated flat box configuration unlike the chair-type massaging apparatus **43**, the massaging apparatus **61** can easily be stored in a narrow space such as in a corner of a room or between furniture articles. Thus, the massaging apparatus **61** is a compact and inexpensive massaging apparatus having substantially the same function as the chair-type massaging apparatus **43**.

As shown in FIG. **15**, shift means **65** is provided in the casing **62** for shifting the roller massaging mechanism **4** longitudinally of the. casing **62**.

The shift means **65** includes a pair of right and left guide rails **66** longitudinally extending on right and left lateral sides of the casing **2**, guide rollers **67** disposed at the four corners of the support frame **8** of the massaging mechanism **4** and rollably fitted in the guide rails **66**, a feed screw shaft **69** extending through a threaded pipe **68** secured to the support frame **8**, and a shift motor **70** for driving the feed screw shaft **69**.

The feed screw shaft **69** is rotatably supported substantially centrally of the casing **61** so as not to move axially, and the threaded pipe **68** threadingly engages the outer periphery of the feed screw shaft **69**. Thus, as the feed screw shaft **69** is rotated by the shift motor **70**, the support frame **8** connected to the threaded pipe **68** moves longitudinally thereby shifting the massaging position of the massaging rollers **16**R,**16**L relative to the user.

On the upper and lower ends of the guide rails **66** are provided limit switches **71** for establishing the upper and lower shifting limits of the massaging mechanism **4**. Further, a guide shaft **73** around which electric wires **72** of the motor **31** associated with the massaging mechanism **4** are spirally wound is fixed on the left side of the left guide rail **66**. Even if the electric wires **72** are loosened in the casing **2** by repeated upward and downward shifting of the massaging mechanism **4**, this arrangement prevents the loosened wires **72** from being caught and drawn toward an unexpected direction and hence from being broken thereby.

Further, the massage drive motor **31** is disposed to project away from the shift motor **70** (upwardly in FIG. **15**) in this embodiment and, hence, there is no need to provide a dead space for avoiding interference between the two motors **31** and **70**, resulting in the casing **62** having a reduced longitudinal dimension.

It should be noted that the foregoing second to fifth embodiments have been described concisely without redundant repeated descriptions by giving like numerals to elements having functions or structures as same as or similar to those of the first embodiment.

It should also be noted that the embodiments described herein are only illustrative of the present invention but not limitative of the present invention. The scope of the present invention is defined by the appended claims, and all variations and equivalents which can read on the claims are included in the present invention.

While the rotary shaft **10** is provided with the dividing portion **10***a* and the half-turn clutch **21** is disposed in the dividing portion **10***a* as an example of the arrangement for switching the position of the massaging rollers **16**, it is possible to employ any other mechanical switching structure, electromagnetic clutch mechanism or manually-operated switching mechanism as an alternative.

The massaging rollers **16** may each be differently varied in configuration so long as the overall configuration thereof is substantially discoid, for example, in the form of an elliptic disc or a polygonal disc.

Further, the massaging mechanism **4** of the present invention may be incorporated into a bed-type massaging apparatus.

INDUSTRIAL APPLICABILITY

The present invention provides a roller massaging mechanism capable of performing a kneading massage operation and other massage operations by means of a pair of right and left massaging rollers.

This massaging mechanism can be incorporated into various massaging apparatus such as relatively small massaging apparatus of stationary type or hand-carriable type, and relatively large massaging apparatus of leaner type or chair type.

What is claimed is:

1. A roller massaging mechanism comprising:

a rotary shaft (**10**);

a pair of right and left massaging rollers (**16**R,**16**L) mounted on an intermediate portion of the rotary shaft (**10**) in a slanted fashion relative to an axis of the rotary shaft (**10**);

drive means (**14**) for rotary-driving the rotary shaft (**10**); and

switching means (**26**) for selectively switching the position of the pair of right and left massaging rollers (**16**R,**16**L) into one of a kneading position where the massaging rollers (**16**R,**16**L) are slanted opposite to each other and a non-kneading position where the massaging rollers (**16**R,**16**L) are slanted parallel with each other.

2. A roller mechanism as set forth in claim **1**, wherein the pair of right and left massaging rollers (**16**R, **16**L) are mounted eccentrically relative to the rotary shaft (**10**) such that a lower portion of one massaging roller (**16**R, **16**L) selectively becomes more distant front the rotary shaft (**10**) relative to a lower portion of the other massaging roller (**16**R, **16**L).

3. A roller massaging mechanism as set forth in claim **1**, wherein the drive means (**14**) is capable of varying the rotary speed of the rotary shaft (**10**) to at least two levels when the pair of right and left massaging rollers (**16**R,**16**L) are in the non-kneading position.

4. A roller massaging mechanism as set forth in claim **1**, wherein:

the rotary shaft (**10**) comprises a first shaft portion (**10**L) supporting one massaging roller (**16**L), and a second shaft portion (**10**R) supporting the other massaging roller (**16**R) and disposed coaxially with the first shaft portion (**10**L); and

the switching means (**26**) comprises a half-turn clutch (**21**) restricting a turnable range of one of the first shaft portion (**10**L) and the second shaft portion (**10**R) relative to the other to about a half turn.

5. A roller massaging mechanism as set forth in claim **4**, wherein the half-turn clutch (**21**) includes:

a tubular member (**20**) unrotatably and coaxially secured to an end portion of the second shaft portion (**10**R) and defining in an outer periphery thereof a transverse slot (**24**) having a length circumferentially of the tubular member (**20**) which corresponds to the half turn; and

a stopper pin (**25**) projecting radially outwardly of an end portion of the first shaft portion (**10**L) rotatably and coaxially inserted into the tubular member (**20**) and having a tip portion staying within the transverse slot (**24**).

6. A roller massaging mechanism as set forth in claim **4**, wherein brake means (**39**) is provided for applying a frictional resistance against rotation of one of the first and second shaft portions (**10**L,**10**R) which is situated on a driven side not directly rotary-driven by the drive means (**14**).

7. A roller massaging mechanism as set forth in claim **1**, wherein the pair of right and left massaging rollers (**16**R,

16L) are coupled to the rotary shaft (10) so as to be rotatable relative to the rotary shaft (10), and second brake means (40) is provided for providing a frictional resistance against rotation of the pair of right and left massaging rollers (16R,16L) relative to the rotary shaft (10).

8. A roller massaging mechanism as set forth in claim 1, further comprising a multiplicity of mini-rollers (57), disposed around a portion of the rotary shaft (10) situated closer to each end of the rotary shaft (10) than a portion of the rotary shaft (10) on which the pair of right and left massaging rollers (16R,16L) are mounted, for performing a rolling massage relative to an affected part of a human.

9. A stationary massaging apparatus comprising a stationary casting (2) defining an opening (2A) oriented upward, and a roller massaging mechanism (4) housed in the casing (2), the roller massaging mechanism (4) including:

a rotary shaft (10) rotatably supported by the casing (2);

a pair of right and left massaging rollers (16R, 16L) mounted on an intermediate portion of the rotary shaft (10) at a location corresponding to the opening (2A) in a slanted fashion relative to an axis of the rotary shaft (10);

drive means (14) for rotary-driving the rotary shaft (10); and

switching means (26) for selectively switching the position of the pair of right and left massaging rollers (16R, 16L) into one of a kneading position where the massaging rollers (16R, 16L) are slanted opposite to each ocher and a non-kneading position where the massaging rollers (16R, 16L) are slanted parallel with each other.

10. A hand-carriable massaging apparatus comprising a hand-carriable casing (53) defining an opening (51) on a front side thereof and having a grip portion (52) on right and left sides thereof, and a roller massaging mechanism (4) housed in the casing (52), the roller massaging mechanism (4) including:

a rotary shaft (10) rotatably supported by the casing (53);

a pair of right and left massaging rollers (16R,16L) mounted on an intermediate portion of the rotary shaft (10) at a location corresponding to the opening (51) in a slanted fashion relative to an axis of the rotary shaft (10);

drive means (14) for rotary-driving the rotary shaft (10); and

switching means (26) for selectively switching the position of the pair of right and left massaging rollers (16R,16L) into one of a kneading position where the massaging rollers (16R,16L) are slanted opposite to each other and a non-kneading position where the massaging rollers (16R,16L) are slanted parallel with each other.

11. A leaner massaging apparatus comprising leaner casting (62) having an opening (63) on a front side thereof, the casting (62) being an independent one-piece casting having a longitudinal dimension substantially corresponding to that of the back of a human and capable of leaning against a wall face (W) with its back side facing the wall face (W), and a roller massaging mechanism (4) housed in the casting (62), the roller massaging mechanism (4) including

a transversely extending rotary shaft (10) rotatably supported in the casting (62);

a pair of right and left massaging rollers (16R, 16L) mounted on an intermediate portion of the rotary shaft (10) at a location corresponding to the opening (63) in a slanted fashion relative to an axis of the rotary shaft (10);

drive means (14) for rotary-driving the rotary shaft (10); and

switching means (26) for selectively switching the position of the pair of right and left massaging rollers (16R, 16L) into one of a kneading position where the massaging rollers (16R, 16L) are slanted opposite to each other and a non-kneading position where the massaging rollers (16R, 16L) are slanted parallel with each other.

12. A massaging apparatus as set forth in claim 11, further comprising shift means (65) for shifting the roller massaging mechanism (4) longitudinally.

13. A chair massaging apparatus comprising a seat portion (41), a backrest portion (40) extending upward from an end portion of the seat portion (41), and a roller massaging mechanism (4) disposed within the backrest portion (40), the roller massaging mechanism (4) including:

transversely extending rotary shaft (10) rotatably supported in the backrest potion (40);

a pair of right and left massaging rollers (16R, 16L) mounted on an intermediate potion of the rotary shaft (10) at a location corresponding to a transversely central portion of the backrest portion (40) in a slanted fashion relative to an axis of the rotary shaft (10);

drive means (14) for rotary-driving the rotary shaft (10); and

switching means (26) for selectively switching the position of the pair of right and left massaging rollers (16R, 16L) into one of a kneading position where the massaging rollers (16R, 16L) are slanted opposite to each other and a non-kneading position where the massaging rollers (16R, 16L) are slanted parallel with each other.

14. A massaging apparatus as set forth in claim 13, further comprising shift means for shifting the roller massaging mechanism (4) upwardly and downwardly.

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